

DESCRIPTION OF A NEW SPECIES OF NOTIDANOID SHARK (HEXANCHUS CORINUS), FROM THE PACIFIC COAST OF THE UNITED STATES.

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Hexanchus corinus, sp. nov.

Head large, broad, depressed and very blunt anteriorly; the length of snout from front of mouth little more than half the interorbital space and rather less than the distance from the front of the mouth to angle of the mouth.

No median tooth in upper jaw. Two sharp, slender teeth in front of upper jaw, behind which is a row of four others similar but a little larger; the two outer larger than the inner, all without basal cusps. Behind these are four others similar and still a little larger. These are directed backward, and should not be considered as functional teeth.

The first of the large teeth in the upper jaw is larger than the succeeding teeth. It has a sharp point hooked outward, and a single strong cusp on its outer margin, its inner edge not serrate. The second tooth, on both sides, has the basal cusp obsolete. The third tooth is like the first, but a little smaller. The fourth tooth is slightly serrated on the inner margin, and has two strong cusps on the outer at base. The fifth and sixth are similar to the fourth, but more strongly serrate on the inner margin. The seventh, eighth, and ninth are small, and the number of cusps is increased, so that they approach the form of the teeth of the lower jaw.

The median tooth of the lower jaw is very small, with a slight median cusp and three cusps on the outer margin, the uppermost the largest. The first lateral tooth has six cusps; the first the largest, the others progressively decreasing; the long edge of the first cusp is finely serrated, but has no basal cusp. The second, third, fourth, and fifth teeth are precisely similar in size and form to the first. The sixth and seventh are somewhat smaller. In the smaller specimen, from Soquel, the inner edge of the teeth is not serrated. Behind the large teeth in each jaw is the usual series of small blunt teeth, which in this species are little developed.

Nostrils near the tip of the snout. Furrow of skin at angle of mouth reaching half way from the angle of the mouth to the gill-opening. Eyes large, $\frac{2}{3}$ the length of the snout. Spiracles small, far behind the eyes. Gill-openings 6. Pectoral moderate, as long as from first gill-opening to tip of lower jaw. Ventrals small, reaching past front of the small dorsal. Dorsal a little higher than anal, and terminating over the middle of the latter fin. Tail long, twice as long as head, a little less than $\frac{1}{3}$ the total length, little bent upward; its basal lobe little developed; the scales on its upper edge somewhat enlarged.

Color very dark sooty, almost black above, grayish black below, without spots or distinct markings. A very obscure grayish lateral streak. Inside of upper lip blotched with black. Young specimen clear brown.

This species is known to us from two specimens, the larger, a female 43 inches in length, the type of the present description, having been obtained by James G. Swan, assistant to the United States Fish Commission, at Neah Bay, near Cape Flattery. The other was secured by Mr. Gilbert at Soquel, on the Bay of Monterey.

This species is closely related to *Hexanchus griseus* Raf. of the Mediterranean and Eastern Atlantic. It differs chiefly in the form of the teeth of the lower jaw, which are serrated on the inner edge, and have on the upper or outer edge only six cusps instead of eight or nine.

Another Notidanoid shark, belonging to the related genus *Heptranchias*, distinguished by the presence of seven gill-openings instead of six, is found with the present species in the same waters. This is *Heptranchias maculatus*, the *Notorhynchus maculatus* or *Notorhynchus borealis* of Ayres and Gill. This species differs from *Heptranchias indicus*, with which it has been confounded by Günther and Duméril, in the lack of a median tooth in the upper jaw, and in the longer tail, which forms rather more than a third of the total length.

Heptranchias maculatus is rather common on the coast of California from Monterey northward. In Humboldt Bay it is especially abundant, and the pursuit of it for the oil in its liver is an industry of some importance.

The teeth in this species undergo some changes with age, and at least are subject to some individual variations, as will be seen from the following descriptions, which may be compared with Professor Gill's account of the jaws of *Notorhynchus maculatus* (Proc. Ac. Nat. Sci. Phila. 1862, 495) from Nisqually, Washington Territory.

Description of Heptranchias maculatus, juv., from Soquel.

Head rather depressed, broad, rounded. The nostrils almost at the tip of the snout. Length of the snout much less than the interorbital width. Spiracle rather large, nearer the gill-openings than the eye. A long furrow at the angle of the mouth, above which the upper lip extends backward in a broad fold.

In the upper jaw no median tooth; two small teeth near together, well in front, simple and pointed; two a little larger, behind and outside of these; then two more, similar, near together and directly within the first pair; then directly behind the second pair mentioned two much larger ones, pointed, each with a conspicuous cusp on the outer edge near the base on each side, and one or more denticulations. The next tooth is similar, rather larger and directed more outward. The remaining five or six grow still more oblique, but are otherwise similar in form and size, but a little more serrated.

The median tooth in the lower jaw is broad, with two (or three) strong dentations on each side, directed outward, and a very small *median cusp*

at tip. The other teeth are very similar to each other, six in number on each side and slightly increasing in size from the middle. They are much broader than high, and armed with about four sharp points turned outward, besides one or two smaller ones. The first point is longest, and has a small cusp on its side, so that strictly one might call the second cusp longest.

Gill-openings 7, high; pectorals moderate, truncate and slightly concave behind; ventrals moderate, rather backward; anal small, the single small dorsal just in front of it, covering most of the interspace between it and the ventrals.

Tail very long, forming a little more than one-third the length ($2\frac{3}{4}$). A notch near its tip below; the lower lobe a little developed. Upper edge of tail with about three series of scales, much enlarged, so that its entire edge is finely serrated.

Described from two specimens from Soquel, each 18 inches long, one male, the other female.

Description of the jaws of Heptanchias maculatus, adult, from Humboldt Bay.

No median tooth in upper jaw. Upper jaw with two transverse series of teeth on each side of symphysis, the outer series usually with two, the inner with four or five teeth, some of which are placed externally to the main row. They are lanceolate from a quadrate base, the points directed backwards and curved slightly outwards, without cusps or serrations. First tooth of main series similar to symphyseal teeth, but larger and broader, with a larger or smaller cusp at base on outer side and with or without minute serrations on base of inner side; from this towards corner of mouth there is much variation in the development of cusps and serratures, the teeth, however, constantly approximating in shape those of the lower jaw, always differing in being smaller, with external margins more inclined, and with the central cusp larger in comparison to others and more distant from them. Sometimes on each side are four or five teeth, bicuspidate and without serrations on inner edge; in other jaws the second or third tooth from symphysis has *three* or more cusps on the outer margin, and with serrulations or a single cusp at base on inner side. The last large tooth on each side usually broad and low, with the two margins subequal, without prominent median cusp; the inner margin minutely serrate; the outer with seven or eight cusps.

In lower jaw the teeth are much larger than in upper, and are uniform in shape and style of armature; they are wide from a quadrate base, the outer margins comparatively little inclined and with the cusps regularly and rapidly graduated, usually seven in number; the inner margins short, gibbous and much curved, always distinctly serrate; median tooth upright, without median cusp, and with three or four cusps on each margin.

Each jaw has laterally about 12 transverse series of small linear teeth,

scarcely elevated above surface of jaw, resembling the lateral teeth of *Heterodontus*, but *much* smaller and without median crest.

$$\text{Teeth ca. } \frac{12-7-2-2-7-12}{12-6-1-6-12}.$$

We may note here, as further additions to the list of sharks on our Pacific coast, the occurrence of *Somniosus microcephalus* (Bloch) Gill in Puget's Sound; of *Lamna cornubica* L. in Monterey Bay; and of a species closely related to *Eulamia lamia* (Risso) Gill in San Diego Bay. The shark recorded by us as *Pleuracromylon levis* (Proc. U. S. Nat. Mus. 1880, 52) is *Rhinotriacis henlei* Gill. This species is not a genuine *Triacis*, and it appears to us to be congeneric with *P. levis*, from which it differs in the greater development of the basal cusps of the teeth.

Table of measurements.

Species, *Hexanchus corinus* J. & G.; sex, ♀. Locality, Neah Bay, Washington Territory.

	Inches and 100ths.	100ths of length.
Extreme length	43
Body:		
Greatest height		8
Head:		
Greatest length		16
Greatest width		12
Width of interorbital area		9
Length of snout		5½
Length of cleft of mouth		6½
Distance from eye to spiracle		5½
Length of nostril		1⅓
Distance from mouth to nostril		4
Height of first gill-opening		7
Dorsal:		
Distance from snout		53
Length of base		6½
Greatest height		0½
Anal:		
Length of base		6
Greatest height		4½
Caudal:		
Length		32
Pectoral:		
Length		12
Ventral:		
Length of base		8

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